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AR201-13214B

HPV ROBUST SUMMARY DOCUMENT

ORIGINAL

CHEMICAL: **4-Chloro-l-Methyl Benzene**

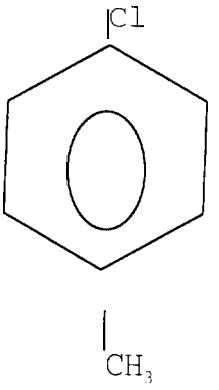
p-Chlorotoluene

CAS No.: ***106-43-4***

EINECS No.: 203-397-0

CHEMICAL IDENTITY

1.1 CAS-number: **106-43-4**
1.2 Name : Benzene, 1-chloro-4-methyl-
1.3 Common synonyms: Benzene, 4-chloro-l-methyl-, 4-chlorotoluene, p-chlorotoluene
1.4 Empirical formula: C_7H_7C1
1.4.1 Molecular weight: 126.59
1.5 Structural formula:



1.6 Fur i ty of industrial product:
1.6.1 Degree of purity: technical grade >98 % 1-chloro-4-methylbenzene
pure grade >99.5% 1-chloro-4-methylbenzene
1.6.2 Major impurities:

technical grade: < 1% 1-chloro-3-methylbenzene, < 0.5% 1-chloro-2-methylbenzene, and < 0.5% dichlorotoluenes

pure grade: < **0.2%** 1-chloro-3-methylbenzene, < 0.2% 1-chloro-2-methylbenzene, and < 0.1% dichlorotoluenes

References:

Gerhartz, W. (exec. Ed). Ullmann's Encyclopedia of Industrial Chemistry. 5th edition, Volume Al: Deerfield Beach, FL: VCH Publishers, p. VA6 346, (1985 to present).

2. PHYSICAL-CHEMICAL DATA

2.1 MELTING POINT

2.1.1
Test Substance :

- Identity: p-chlorotoluene

Method:

. Method:

- GLP (Y/N) : unknown
- Year (study performed): 1994 ?
- Remarks : ?

Results:

- Melting point value = 7 . 5°C
- Decomposition (Y/N/ambiguous): nothing reported
- Sublimation (Y/N/ambiguous) : nothing reported

Conclusions:

P-chlorotoluene may exist as a solid under typical environmental conditions found in colder climates.

Data Quality : reliable (peer reviewed)

References:

Lide, D.R. (ed.). CRC Handbook of Chemistry and Physics. 75th ed. Boca Raton, Fl: CRC Press Inc., 1994-95., p. 3-35.

Material Safety Data Sheet for Parachlorotoluene, MSDS No. M7611, Occidental Chemical Corporation, Dallas, TX., 1999.

2.1.2

Test Substance:

- Identity: p-chlorotoluene

Method:

- Method: Differential Scanning Calorimetry (DSC)
- GLP (Y/N) : unknown
- Year (study performed) : 1999
- Remarks:

Results:

- Melting point value = 5.8°C and 5.4°C
- Decomposition (Y/N/ambiguous): nothing reported
- Sublimation (Y/N/ambiguous): nothing reported

Conclusions :

This laboratory testing supports other reported values for this

endpoint.

Data Quality: reliable

References:

Cortellucci, N. and S. Higgins, PCT heats of fusion and vaporization.

Occidental Chemical Corporation, Internal Memo, 1999.

2.2 BOILING POINT

2.2.1

Test Substance:

- Identity: p-chlorotoluene

Method:

- Method
- GLP (Y/N) : unknown
- Year (study performed): 1994
- Remarks: ?

Results:

- Boiling point value = 162.4°C
- Decomposition (Y/N/ambiguous) : nothing reported
- Sublimation (Y/N/ambiguous) : nothing reported

Conclusions:

The high boiling point, moderate melting point and significant volatility of p-chlorotoluene indicate that it may be present as a solid, liquid or gaseous state under normal environmental exposure scenarios.

Data Quality : reliable (peer reviewed)

References:

Lide, D.R. (ed.). CRC Handbook of Chemistry and Physics. 75"' ed. Boca Raton, Fl: CRC Press Inc., 1994-95., p. 3-35.

2.2.2

Test Substance:

- Identity: p-chlorotoluene

References:

Material Safety Data Sheet for Parachlorotoluene, MSDS No. M7611, Occidental Chemical Corporation, Dallas, TX., 1999.

2.3 VAPOR PRESSURE

2.3.1

Test Substance:

. Identity: p-chlorotoluene

Method:

- Method
- GLP (Y/N): unknown
- Year study performed : 1989
- Remarks

Results: 2.79 mm Hg at 20°C

Conclusion:: :

Data Quality : reliable (peer reviewed)

References:

Daubert, T.E. and R.P. Danner. Physical and thermodynamic properties of pure chemicals data compilation. Washington, D.C.: Taylor and Francis, 1989.

2.3.2

Test Substance:

- Identity: p-chlorotoluene

Method:

- Method
- GLP (Y/N) unknown
- (study performed) : 1989
- Remarks

Results: 2.0 mm Hg at 20°C

Conclusions:

Data Quality:

References:

2.4 PARTITION COEFFICIENT

Test Substance :

- Identity: p-chlorotoluene

Method:

- Method
- GLP (Y/N)
- Year (study performed): 1985
- Remarks : Recommended value

Results :

Partition coefficient n-octanol/water: log P_{ow} = 3.33

Conclusions:

Data Quality:

References:

Hansch, C.; A. Leo, D. Hoekman. Exploring QSAR - hydrophobic, electronic, and steric constants. Washington, DC: American Chemical Society. , 29. , 1995.

2.5 WATER SOLUBILITY

Test Substance:

- Identity: p-chlorotoluene

Method:

- Method
- GLP (Y/N)
- Year (study performed) : 1992
- Remarks

Results: 106 mg/L at 20°C

Conclusions:

Data Quality:

References:

Yalkowsky S .H. and R.M. Dannenfelser. Aquasol database of aqueous solubility. Version 5. College of Pharmacy, University of Arizona-Tucson, AZ. PC Version, 1992.

Test Substance:

- Identity: p-chlorotoluene

Method:

- Method : Laboratory measured
- GLP (Y/N): unknown
- Year (study performed) : 1980
- Remarks

Results: 73.8 mg/L at 23°C

Conclusions:

Data Quality:

References:

Cortellucci, N. ; Solubility of parachlorotoluene in water.; Hooker Chemical Company. Report.; 1980.

3. ENVIRONMENTAL FATE AND PATHWAY DATA

3.1 PHOTODEGRADATION

Test Substance:

- Identity:

Method:

- Method:
- GLP (Y/N): n/a
- Year (study performed)
- Remarks

Results:

- Reaction with photochemically produced OH radicals
- Estimated half-life = 9 days

Conclusions:

Data Quality:

References:

Meylan, W.M., and P.H. Howard, Chemosphere 26:2293-99, 1993.

3.2 STABILITY IN WATER

Test Substance:

- Identity: 2-chlorotoluene

Method:

- Method: Experimental marine mesocosm
- GLP (Y/N):
- Year (study performed): 1983
- Remarks: The study was run under simulated winter conditions with a temperature range of 3-7 °C, and an initial aqueous 2-chlorotoluene concentration of 2.3µg/L.

Results:

Estimated Half-life = 12 days

Conclusions:

Volatilization was found to be the primary mechanism of removal for 2-chlorotoluene.

Data Quality:

References:

Wakeman, S.G. et al., Environ. Sci. Tech. 17: 611-617, 1983.

Other:

Method:

- Method: Lyman Model, based on Henry's Law Constant
- GLP (Y/N): N/A
- Year (study performed): 1990
- Remarks:

The volatilization half-life was estimated for a model river 1 m deep, flowing at 1 m/sec with a wind velocity of 3 m/sec. The volatilization half-life was estimated for a model lake 1 m deep, flowing at 0.05 m/sec with a wind velocity of 0.5 m/sec.

Results:

Estimated volatilization half-life:
River = 4 hours
Lake = 5 days

Conclusions:

Data Quality:

References:

Lyman, W.J. et al., Handbook of chemical property estimation methods. Washington D.C.: Amer. Chem. Soc., pp. 15-1 to 15-29, 1990.

Other:

3.3 TRANSPORT BETWEEN ENVIRONMENTAL COMPARTMENTS (FUGACITY)

Test Substance:

- Identity: orthochlorotoluene

Method:

- Method:
- GLP (Y/N): N/A
- Year (study performed) : 1981
- Remarks: This was a level I fugacity model.
  Fugacity (Pa) = 4.0818555135047063-5

Results:

Compartment	Percent	mol/m^3	concentrations µg/g	µg/m^3
Air	99.47	16.6E-9	17.63-4	21.0E-1
Water	0.44	62.2E-9	78.73-7	78.73-l
Soil	0.05	ll.OE-7	92.73-6	13.9E+1
Sediment	0.05	22.03-7	18.53-5	27.8E+1
susp. Aquatic Mat	0.00	22.03-7	18.53-5	27.8E+1
Biota	0.00	42.8E-7	54.23-5	54.2E+1

Conclusions:

Data Quality:

References:

Wakeman, S.G. et al., Environ. Sci. Tech. 17: 611-617, 1983.

Other:

3.4 BIODEGRADATION

Test Substance:

- Identity: o-chlorotoluene

Method:

- Method: Japanese MITI Screening Test (BOD analysis)

. GLP (Y/N):

- Year (study performed): 1980
- Remarks: The test was run with activated sludge inoculum with a microbial population of 30 mg/L. The test was conducted under aerobic conditions at pH 7 and a temperature of 25°C. This test employed a 14 day incubation period. The o-chlorotoluene concentration was 100 ppm.

Results:

Rate = o-29 %BODT

Conclusions:

Data Quality:

References:

Kawasaki, M.; 1980

Other:

Test Substance:

- Identity: o-chlorotoluene

Method:

- Method: Evaluation of biodegradation.

. GLP (Y/N):

- Year (study performed): 1980
- Remarks: This study involved a freshwater grab sample assessed under aerobic conditions.

Results:

Rate = 2.7±0.96E-11 L/organism/hour
Second order rate constant

Conclusions:

Data Quality:

References:

Paris, D.F. et al.; 1980

Other:

Test Substance:

- Identity: o-chlorotoluene

Method:

- Method: Mesocosm
- . GLP (Y/N):
- Year (study performed): 1983
- Remarks: This study involved grab samples from a marine mesocosm maintained at 3-7 °C. The study was conducted under aerobic conditions with a starting concentration of 2.3 ppm o-chlorotoluene.

Results:

Rate = 0.059 /day
Biodegradation Half-life = 12 days

Conclusions:

Chemical volatilization may have had a significant effect the observed results.

Data Quality:

References:

Wakeman, S.G. et al.; 1983

Other:

4. ECOTOXICITY DATA

4.1 ACUTE TOXICITY TO FISH

4.1.1

TEST SUBSTANCE

- Identity: o-chlorotoluene

METHOD

- Method: EPA-660/3-75-009 (OPTS-42011)
- Type (test type): Acute toxicity test, flow-through
- GLP (Y/N):
- Year (study performed) : 1982
- Species/Strain/Supplier: Fathead minnow (*Pimephales promelas*) /EG&G Bionomics in-house culture (lot #82A6)
- Analytical monitoring:
  Gas chromatography of solvent extracted samples, HP 5840 GC with flame ionization detector & auto-sampler, 10' x 2 mm Pryex column packed with 20% SP2100/0/1% Carbowax 1500 on 100/120 mesh Supelcoport. Program: 3 min. at 90°C, 90-125°C increasing at 6°C, 0.5 min. at 125°C. o-chlorotoluene retention time = 6.90 minutes.
- Exposure period (hours): 96
- Statistical methods: Computer program, Moving average angle (Stephan, 1978)
- Remarks:

  - Test fish
  - Test temperature range:

Results:

Measured concentrations: 0.35, 0.75, 1.0, 1.8, 3.8, 9.1 (mg/L)
Unit = mg/L
96 hr. $LC_{,,}$ = 7.5 (based on measured mean concentrations) 6.1-9.8 (95% confidence intervals)

Conclusions:

Data Quality:

References:

Acute toxicity of o-chlorotoluene to fathead minnow (Pimephales promelas). Report #BW-82-6-1203, EG&G, Bionomics, Wareham, MA, June, 1982.

Other:

4.1.2

TEST SUBSTANCE

- Identity: o-chlorotoluene (Hooker Chemical order #ICG-76)

METHOD

- Method: EPA-660/3-75-009
- Type (test type): Acute toxicity test, flow-through . GLP (Y/N):
- Year (study performed) : 1982
- Species/Strain/Supplier: Rainbow trout (*Salmo gairdneri, Oncorrhynchus myliss*) /Montana Commercial fish supplier (Bionomics lot #81A33)
- Analytical monitoring: Gas chromatography of solvent extracted samples, HP 5840 GC with flame ionization detector & auto-sampler, 10' x 2 mm Pryex column packed with 20% SP2100/0/1% Carbowax 1500 on 100/120 mesh Supelcoport. Program: 3 min. at 90°C, 90-125°C increasing at 6°C, 0.5 min. at 125°C. o-chlorotoluene retention time = 6.90 minutes.
- Exposure period (hours) : 96
- Statistical methods: Computer program, Binomial probability (Stephan, 1978)
- Remarks:
  - Test fish
  - Test temperature range:

Results:

Nominal concentrations: 0, 0.56, 1.1, 2.2, *4.5, 9.0, 18.0* (mg/L)
Measured mean conc.: <0.032, 0.23, 1.8, *0.76, 1.4, 3.0,* 7.3 (mg/L)

Unit = mg/L
96 hr. $LC_{,,}$ = 2.3 (based on mean measured concentrations) 1.8-3.0 (95% confidence intervals)

Conclusions:

The differences between the nominal concentrations and the measured mean concentrations indicate losses due to chemical volatility. Diluter malfunction was thought to have produced the anomalous concentration of 1.8 mg/l versus the desired nominal concentration of 1.1 mg/L.

Data Quality:

Despite some data irregularity, it is believed that the generated $LC_{,,}$ value is useful in determining the level of acute aquatic toxicity for this compound. ECOSAR model estimates predict a 96-hour $LC_{,,}$ value of 4.3 mg/L based on a log K_{ow} of 3.42.

References:

Acute toxicity of o-chlorotoluene to rainbow trout (Salmo gairdneri). Report #BW-82-6-1204, EG&G, Bionomics, Wareham, MA, June, 1982.

Other:

4.1.3
TEST SUBSTANCE

- Identity: o-chlorotoluene

METHOD

- Method:
- Type (test type): Acute toxicity
- GLP (Y/N):
- Year (study performed) : 1980
- Species/Strain/Supplier: Bleak (*Alburnus alburnus*)
- Analytical monitoring:
- Exposure period (days): 4
- Statistical methods:
- Remarks:

  - Test fish

- Test temperature range:

Results:

96 hr. $LC_{,,}$ = 7.8

Conclusions:

Data Quality:

References:

Bengtsson, B.E. and M. Tarkpea, The acute toxicity of some substances carried by ships. Mar. Pollut. Bull. 14(6): 213-214,1983.

Other:

4.1.4
TEST SUBSTANCE

- Identity: o-chlorotoluene

METHOD

- Method: EG&G Bionomics-Methods for conducting early life stage toxicity tests with fathead minnow (Pimephales promelas).
- Type (test type) : Embryo-larval acute toxicity
- GLP (Y/N):
- Year (study performed): 1982
- Species/Strain/Supplier: Fathead minnow (*Pimephales promelas*) /EG&G Bionomics in-house culture
- Analytical monitoring:
  Gas chromatography of solvent extracted samples, HP 5840 GC with flame ionization detector & auto-sampler, 10' x 2 mm Pryex column packed with 20% SP2100/0/1% Carbowax 1500 on 100/120 mesh Supelcoport. Program: 3 min. at 90°C, 90-125°C increasing at 6°C, 0.5 min. at 125°C. o-chlorotoluene retention time = 6.90 minutes.

- Exposure period (days): 30
- Statistical methods: Analysis of variance, Dunnett's procedure
- Remarks:

- Test fish
- Test temperature range:

Results:

Measured mean conc.: <0.032, 0.25, 0.48, 0.76, 1.4, 2.9, 7.1(mg/L)
Unit = mg/L
30 day MATC = >1.4<2.9 mg/L (survival)
No significant affect on growth at concentrations of ≤ 2.9 mg/L.
Significant larval mortality at concentrations ≥ 2.9 mg/L.
No observed affect on hatch success for concentrations ≤ 7.1 mg/L.

Conclusions:

Data Quality:

References:

The toxicity of o-chlorotoluene to fathead minnow (Pimephales promelas) embryos and larvae. Report #BW-82-7-1235, EG&G, Bionomics, Wareham, MA, July, 1982.

Other:

4.1.5

TEST SUBSTANCE

- Identity: p-chlorotoluene

METHOD

- Method: SAR Estimation
- Type (test type): ECOSAR, models for neutral organics and halogenated aromatic hydrocarbons
- GLP (Y/N): N/A
- Year (study performed): 1999
- Species/Strain/Supplier: Fish, freshwater
- Analytical monitoring: N/A
- Exposure period (hours): 96

- Statistical methods:
- Remarks :

  - Test fish
  - Test temperature range:

Results:

estimated 96 hr. $LC_{,,}$ = 5.3 mg/L
(based on log K_{ow} = 3.33)

Conclusions :

Data Quality:

References:

Hermans, J., H. Canton, P. Janssen and R. De Jong. 1984. Quantitative structure-activity relationships and toxicity studies of mixtures of chemicals with anaesthetic potency: Acute lethal and sublethal toxicity to Daphnia magna. Aquatic Toxicology 5:143-154.

Other:

4.1 ACUTE TOXICITY TO FISH

Test Substance:

- Identity: o-chlorotoluene

Method:

- Method:
- Type (test type):
- GLP (Y/N):
- Year (study performed) : 1983
- Species/Strain/Supplier:
- Analytical monitoring:
- Exposure period (unit):
- Statistical methods:
- Remarks:

  - Test fish
  - Test temperature range:

Results:

Conclusions:

Data Quality:

References:

et al.; 1983

Other:

4.1.6

TEST SUBSTANCE

- Identity: o-chlorotoluene

METHOD

- Method:
- Type (test type):
- GLP (Y/N):
- Year (study performed): 1983
- Species/Strain/Supplier:
- Analytical monitoring:
- Exposure period (unit) :
- Statistical methods:
- Remarks:
  - Test fish
  - Test temperature range:

Results:

Conclusions:

Data Quality:

References:

et al.; 1983

Other:

4.2 TOXICITY TO AQUATIC PLANTS

4.2.1

TEST SUBSTANCE

- Identity: o-chlorotoluene

METHOD

- Method: Cell Multiplication Inhibition Test
- Type (test type): Algal Biomass
- GLP (Y/N):
- Year (study performed) : 1990
- Species/Strain/Supplier: Green algae *(Scenedesmus subspicatus)*
- Analytical monitoring:
- Exposure period (days) : 4
- Statistical methods:
- Remarks:

  - Test organisms:
  - Test temperature range:

Results:

96 hr. $EC_{,,}$ = >100 mg/L

Conclusions:

Data Quality:

References:

Kuhn, R. and M. Pattard; Results of the harmful effects of water pollutants to green algae(*Scenedesmus subspicatus)* in the cell multiplication inhibition test. Water Res. 24(1):31-38, 1990.

Other:

4.2.2

TEST SUBSTANCE

- Identity: o-chlorotoluene

METHOD

- Method: Cell Multiplication Inhibition Test

- Type (test type): Algal Population Growth
- GLP (Y/N):
- Year (study performed): 1990
- Species/Strain/Supplier: Green algae (Scenedesmus ***subspicatus)***
- Analytical monitoring:
- Exposure period (days): 4
- Statistical methods:
- Remarks:

  - Test organisms:
  - Test temperature range:

Results:

96 hr. $EC_{,,}$ = >100 mg/L

Conclusions:

Data Quality:

References:

Kuhn, R. and M. Pattard; Results of the harmful effects of water pollutants to green algae(*Scenedesmus* ***subspicatus)*** in the cell multiplication inhibition test, Water Res. 24(1):31-38, 1990.

Other:

TEST SUBSTANCE

- Identity: p-chlorotoluene

METHOD

- Method : SAR Estimation
- Type (test type) : ECOSAR, models for neutral organics and halogenated aromatic hydrocarbons
- GLP (Y/N) : N/A
- Year (study performed) : 1999
- Species/Strain/Supplier: Green Algae
- Analytical monitoring: N/A
- Exposure period (hours): 96
- Statistical methods:

- Remarks :

Results:

estimated 96 hr. EC_{50} = 4.2 mg/L
(based on log K_{ow} = 3.33)

Conclusions:

Data Quality:

References:

Hermans, J., H. Canton, P. Janssen and R. De Jong. 1984. Quantitative structure-activity relationships and toxicity studies of mixtures of chemicals with anaesthetic potency: Acute lethal and sublethal toxicity to Daphnia magna. Aquatic Toxicology 5:143-154.

Other:

4.3 TOXICITY TO AQUATIC INVERTEBRATES

4.3.1
TEST SUBSTANCE

- Identity: o-chlorotoluene

METHOD

- Method:
- Type (test type): Acute Toxicity Test
- GLP (Y/N):
- Year (study performed) : 1977
- Species/Strain/Supplier: Water flea ***(Daphnia magna)***
- Analytical monitoring:
- Exposure period (hours): 24
- Statistical methods:
- Remarks:

  - Test organisms:
  - Test temperature range:

Results:

24 hr. $LC_{,,}$ = 74 mg/L

Conclusions:

Data Quality:

References:

Bringmann, G. and R. Kuhn, R., The effects of water pollutants on ***Daphnia magna.*** Z. Wasser-Abwasser-Forsch. 10(5):161-166, 1977.

Other:

4.3.2
TEST SUBSTANCE

- Identity: o-chlorotoluene

METHOD

- Method: EG&G, Bionomics protocol for conducting 48-hour flow-through toxicity tests with the water flea (Daphnia magna) . (based on EPA-660/3-75-009)
- Type (test type): Acute toxicity test, flow-through

. GLP (Y/N):
- Year (study performed): 1982
- Species/Strain/Supplier:: Water flea (*Daphnia* ***magna)***
- Analytical monitoring:
- Exposure period (hours) : 48
- Statistical methods: Computer program, Moving average angle (Stephan, 1978)
- Remarks:

  - Test organisms:
  - Test temperature range:

Results:

Nominal concentrations: 0, 0, 0.94, 1.9, 3.8, 7.5, 15(mg/L)
Measured mean conc.: <0.033,<0.033, 0.33, 0.45, 0.72, 1.4, 4.5(mg/L)
Unit = mg/L
48-hr. LC,, = 1.1 mg/L
1.0-1.2 (95% confidence intervals)
48-hr. NOEC = 0.45 mg/L

Conclusions:

Data Quality:

References:

Acute toxicity of o-chlorotoluene to water flea (Daphnia magna) Report #BW-82-7-1206, EG&G, Bionomics, Wareham, MA, July, 1982.

Other:

TEST SUBSTANCE
- Identity: p-chlorotoluene

METHOD
- Method: SAR Estimation
- Type (test type): ECOSAR, models for neutral organics and halogenated aromatic hydrocarbons
- GLP (Y/N): N/A
- Year (study performed) : 1999
- Species/Strain/Supplier: Daphnid

- Analytical monitoring: N/A
- Exposure period (hours): 48
- Statistical methods:
- Remarks :

Results:

estimated 48 hr. $LC_{,,}$ = 6.2 mg/L
(based on log K_{ow} = 3.33)

Conclusions :

Data Quality:

References:

Hermans, J., H. Canton, P. Janssen and R. De Jong. 1984. Quantitative structure-activity relationships and toxicity studies o-f mixtures of chemicals with anaesthetic potency: Acute lethal and sublethal toxicity to Daphnia magna. Aquatic Toxicology 5:143-154.

Other:

TEST SUBSTANCE

- Identity : P-chlorotoluene

METHOD

- Method: SAR Estimation
- Type (test type): ECOSAR, models for neutral organics and halogenated aromatic hydrocarbons
- GLF (Y/N): N/A
- Year (study performed) : 1999
- Species/Strain/Supplier: Mysid
- Analyt i cal monitoring: N/A
- Exposure period (hours) : 96
- Statistical methods:
- Remarks:

Results:

estimated 96 hr. $LC_{,}$ = 0.6 mg/L
(based on log K_{ow} = 3.33)

Conclusions:

Data Quality:

References:

Hermans, J., H. Canton, P. Janssen and R. De Jong. 1984. Quantitative structure-activity relationships and toxicity studies of mixtures of chemicals with anaesthetic potency: Acute lethal and sublethal toxicity to Daphnia magna. Aquatic Toxicology 5:143-1 54

4.3.3

TEST SUBSTANCE

- Identity: o-chlorotoluene

METHOD

- Method:
- Type (test type): Reproductive Toxicity Test
- GLP (Y/N):
- Year (study performed): 1989
- Species/Strain/Supplier: Water flea ***(Daphnia magna)***
- Analytical monitoring:
- Exposure period (hours): 24
- Statistical methods:
- Remarks:
  - Test organisms:
  - Test temperature range:

Results:

24 hr. $EC_{,,}$ = 20 mg/L

Conclusions:

Data Quality:

References:

Kuhn, R., M. Pattard, K. Pernak and A. Winter; Results of the harmful effects of water pollutants to ***Daphnia*** magna in the 21 day reproduction test. Water Res. 23(4):501-510, 1989.

4.3.4

TEST SUBSTANCE

- Identity: o-chlorotoluene (Occidental Chemical ICG5-0203, 91.1% active agent)

METHOD

- Method: SBI test protocol- Study plan for conducting a flow through chronic toxicity test with ortho-chlorotoluene and Daphnia maqna (11 October 1984).
- Type (test type): Chronic toxicity test, flow-through
- GLP (Y/N):
- Year (study performed) : 1986
- Species/Strain/Supplier: Water flea ***(Daphnia magna)***
- Analytical monitoring:
  Gas chromatography of solvent extracted samples, HP 5880 GC with flame ionization detector, 10 meter wide bore (530 µm ID) capillary column liquid phase with methyl Silicone. Temperatures: Column = 80 °C, Detector = 250 °C, Injection Port = 250 °C, Signal = D, Run ***time = 1.4.***
- Exposure period (days): 21
- Statistical methods: Computer program, Moving average angle (Stephan, 1978)
- Remarks:

  - Test organisms:
    Test temperature range:

Results:

Nominal concentrations: 0, 0, 0.12, 0.25, 0.40, ***1.0,*** 2.0(mg/L)
Measured mean conc.: ND, ND, 0.014, 0.080, 0.16, 0.21, 0.73(mg/L)
Unit = mg/L
21-day MATC = 0.39 mg/L
1.0-1.2 (95% confidence intervals)
21-day. NOEC (reproduction)= 0.21 mg/L
100% mortality at 0.73 mg/L

Conclusions:

Data Quality:

References:

The chronic toxicity of ortho-chlorotoluene to Daphnia Magna under flow-through conditions. Report #BW-86-9-2121 (Study #10826.0885.6100), Springborn Bionomics, Wareham, MA, August, 1986.

TEST SUBSTANCE

- Identity: o-chlorotoluene

METHOD

- Method:
- Type (test type): Acute Toxicity Test
- GLP (Y/N):
- Year (study performed): 1983
- Species/Strain/Supplier: Harpacticoid copepod ***(Nitocra spinipes)***
- Analytical monitoring:
- Exposure period (hours) : ***96***
- Statistical methods:
- Remarks:

  - Test organisms:
  - Test temperature range:

Results:

96 hr. $LC_{,,}$ = 40-50 mg/L

Conclusions:

Data Quality:

References:

Bengtsson, B.E. and M. Tarpea, The acute aquatic toxicity Of some substances carried by ships. Mar. Pollut. Bull. 14(6):213-214, 1983.

TEST SUBSTANCE

- Identity: **p-chlorotoluene**

METHOD

- [illegible] SAR Estimation

- Type (test type) : ECOSAR, models for neutral organics and halogenated aromatic hydrocarbons
- GLP (Y/N): N/A
- Year (study performed): 1999
- Species/Strain/Supplier: Daphnid
- Analytical monitoring: N/A
- Exposure period (day) : 16
- Statistical methods:
- Remarks:

Results:

estimated 16-day EC_{50} or LC_{50} = 0.6 mg/L
(based on log K_{ow} = 3.33)

Conclusions:

The EPA ECOSAR model predicts that p-chlorotoluene would exhibit moderate toxicity to freshwater invertebrates.

Data Quality:

Model generated **estimates** are not as reliable as actual test data, but the SARs used by this model use formulas based on test data for similar organic compounds.

References:

Hermans, J., H. Canton, P. Janssen and R. De Jong. Quantitative structure-activity relationships and toxicity studies of mixtures of chemicals with anaesthetic potency: Acute lethal and sublethal toxicity to Daphnia magna. Aquatic Toxicology 5:143-154, 1984.

5. HEALTH DATA

5.1 ACUTE TOXICITY

5.1.1

TEST SUBSTANCE

- Identity: p-chlorotoluene (Lot no. D-64-608)

METHOD

- Method : Toxicology Division Lilly Research Laboratories
- Type (test type) : Acute Oral Toxicity
- GLP (Y/N) : N
- Year (study performed) : 1964
- Species/Strain: Rat/Sprague-Dawley
- sex: Male
- ♂♀ animals per dose: 2/dose
- Vehicle: corn oil or undiluted (dose dependent)
- Route of administration: oral (intubation/stomach tube)

Remarks:

- Age : adult (180-333 grams)
- Doses (@/kg) : 10, 31.6, 100, 1000 and 3160
  Doses per time period:one/14 days
- Volume administered or concentration:
- Post dose observation period:14 day

Results:

LD_{50} = 1780 µl/kg (1900 mg/kg)

Remarks:

The observed toxic effects included: depression, lacrimation, labored respiration, ataxia, body tremors, depressed righting and placement reflexes and prostration. It was not specified at what doses these effects were observed. The following conditions were observed during necropsy: congestion of the lungs, kidneys, and adrenals; and inflammation of the gastrointestinal tract. The author classified p-chlorotoluene as slightly toxic.

Conclusions:

These test results indicate that p-chlorotoluene exhibits low to

moderate toxicity to this species.

Data Quality:
Unreliable (based on small size of exposure groups)

References:
Powers, M. c., Acute oral dose range - rats. Hazelton **Laboratories,** Inc., Falls Church, Virginia, sponsored by Hooker Chemical Corporation, 1964.

5.1.2
TEST SUBSTANCE

- Identity: o-chlorotoluene (lot 90, study id. No. 22679 composition was 96.4% o-chlorotoluene, 3% p-chlorotoluene and < 0.5% m-chlorotoluene)

METHOD

- Method: Toxicology Division Lilly Research Laboratories
- Type (test type): Acute Oral Toxicity
- GLP (Y/N): N
- Year (study performed) : 1980
- Species/Strain: Rat/
- sex : Male/Female
- No. of animals per dose: 5 of each sex/dose
- Vehicle: gavage (undiluted)
- Route of administration: oral intubation

Remarks:
Age: young adult (115-150 **grams)**
- Doses (mg/kg) : 1700, 2300, 3330 and 4600
Doses per time period: one/14 days
Volume administered or concentration:
- Post dose observation period: 14 day

Results :

LD_{50} = 2100 ± 300 mg/kg

Remarks:

Decreased motor activity, body tremors, cyanosis, and salivation were observed at all dose levels versus the control animals. Post-mortem necropsy found that exposed animals exhinited irritation of the gastrointestinal tract.

Conclusions:

These test results indicate that p-chlorotoluene exhibits low to moderate toxicity to this species.

Data Quality:

reliable

References:

Acute oral LD_{50} toxicity study in rats for p-chlorotoluene, p-chlorobenzotrichloride, dichlorotoluene. Springborn Institute for Bioresearch, Inc. 1980.

5.1 ACUTE TOXICITY

TEST SUBSTANCE

- Identity: o-chlorotoluene (lot 90, study id. No. 22679 composition was 96.4% o-chlorotoluene, 3% p-chlorotoluene and < 0.5% m-chlorotoluene)

METHOD

- Method: Toxicology Division Lilly Research Laboratories
- Type (test type): Acute Oral Toxicity
- GLP (Y/N): N
- Year (study performed): 1974
- Species/Strain: Rat/Harlan
- [illegible] Male/Female
- [illegible] of animals per dose: 10 of each sex/dose
- Vehicle: gavage (undiluted)
- Route of administration: oral

Remarks:

- Age: young adult (115-150 grams)
- Doses (mg/kg): 2165, 2706, 3284 and 3951
- Doses per time period: one/14 days

- Volume administered or concentration:
- Post dose observation period:14 day
- Exposure duration (for inhalation studies)

Results:

LD_{50} (males) = 3464 ± 430 mg/kg
LD_{50} (females) = 3031 ± 220 mg/kg

Remarks:

Conclusions:

Data Quality:

References:

Arthur, B.H., W.R. Gibson, W.J. Griffing and C.C. Kehr, The effect on laboratory animals from single dose exposures to o-chlorotoluene. Toxicology Division Lilly Research Laboratories, 1974.

TEST SUBSTANCE

- Identity: ortho-chlorotoluene (not specified)

METHOD

- Method: Toxicology Division Lilly Research Laboratories
- Type (test type): Acute Oral Toxicity Screen
- GLP (Y/N): N
- Year (study performed): 1976
- Species/Strain: Rat/Sprague-Dawley albino
- Sex: Male/Female
- No. of animals per dose: 5/dose
- Vehicle: none, undiluted OCT
- Route of administration: oral

Remarks:

- Age: adult (205-240 gram averages/dose

group)
- Doses (mg/kg): 2000, 2510, 3160, 3980 and 5010
- Doses per time period:one/14 days
  Volume administered or concentration:
- Post dose observation period:14 days
- Exposure duration (for inhalation studies)

Results:

LD_{50} (male/female) = 2350 mg/kg (95% confidence interval: 2090-2630 mg/kg)

Remarks:

Conclusions:

Data Quality:

References:

Acute toxicity screen with ortho-chlorotoluene. Younger Laboratories, Inc., 1976.

- Identity: o-chlorotoluene
  (lot 90, study id. No. 22679 composition was 96.4% o-chlorotoluene, 3% p-chlor ɒ ɑ1 uene and < 0.5% m-chlorotoluene)

METHOD

- Method: Toxicology Division Lilly Research Laboratories
- Type (test type): Acute Oral Toxicity
- GLP (Y/N): N
- Year (study performed): 1974
- Species/Strain: Rat/Harlan
- ♂♀ Male/Female
- ♂ ♀ of animals per dose: 10/dose
- Vehicle: gavage (2.5-10% emulsifion in 5% acacia solution)
- Route of administration: oral

Remarks:

Age: 48-72 hour old

- Doses (mg/kg): 500, 700, 1000, 1400 and 2000
- Doses per time period:one/14 days
- Volume administered or concentration:
- Post dose observation period:14 days
- Exposure duration (for inhalation studies)

Results:

LD_{50} = 1659 ± 225 mg/kg

Remarks:

Conclusions:

Data Quality:

References:

Arthur, B.H., W.R. Gibson, W.J. Griffing and C.C. Kehr, The effect on laboratory animals from single dose exposures to o-chlorotoluene. Toxicology Division Lilly Research Laboratories, 1974.

Other:

TEST SUBSTANCE

- Identity: ortho-chlorotoluene (not specified)

METHOD

- Method: Toxicology Division Lilly Research Laboratories
- Type (test type): Acute Oral Toxicity
- GLP (Y/N): N
- Year (study performed): 1976
- Species/Strain: Rat/Sprague-Dawley albino
- [illegible] Male/Female
- [illegible] of animals per dose: 5/dose
- Vehicle: not specified
- Route of administration: oral

Remarks:

- Age: adult (205-240 gram averages/dose group)
- Doses (mg/kg): 2000, 2510, 3160, 3980 and 5010
- Doses per time period:one/14 days
- Volume administered or concentration:
- Post dose observation period:14 days
- Exposure duration (for inhalation studies)

Results:

LD_{50} (male/female) = 2350 mg/kg (95% confidence interval: 2090-2630 mg/kg)

Remarks:

Conclusions:

Data Quality:

References:

Arthur, B.H., W.R. Gibson, W.J. Griffing and C.C. Kehr, The effect on laboratory animals from single dose exposures to o-chlorotoluene. Toxicology Division Lilly Research Laboratories, 1974.

Other:

- Identity: o-chlorotoluene
  (lot 90, study id. No. 22679 composition was 96.4% o-chlorotoluene, 3% p-chlorotoluene and < 0.5% m-chlorotoluene)

METHOD

- Method: Toxicology Division Lilly Research Laboratories
- Type (test type): Acute Oral Toxicity
- GLP (Y/N): N
- Year (study performed) : 1974
- Species/Strain: Mouse/ICR
- ♦♏⊠⊟ Male/Female
- ✍ ⚲□✍ of animals per dose: 10 of each sex/dose
- Vehicle: gavage (20% emulsion in 5% acacia solution)
- Route of administration: oral

Remarks:

- Age: young adult (13-18 grams)
- Doses (mg/kg): 2250, 2750, 3300, 4000 and 5000
  Doses per time period: one/14 days
- Volume administered or concentration:
- Post dose observation period: 14 day
- Exposure duration (for inhalation studies)

Results:

LD_{50} (males) = 3776 ± 213 mg/kg

LD_{50} (females) = 3902 ± 284 mg/kg

Remarks:

Conclusions:

Data Quality:

References:

Arthur, B.H., W.R. Gibson, W.J. Griffing and C.C. Kehr, The effect on laboratory animals from single dose exposures to o-chlorotoluene. Toxicology Division Lilly Research Laboratories, 1974.

Other:

- Identity: o-chlorotoluene (lot 90, study id. No. 22679 composition was 96.4% o-chlorotoluene, 3% p-chlorotoluene and < 0.5% m-chlorotoluene)

METHOD

- Method: Toxicology Division Lilly Research Laboratories
- Type (test type): Acute Oral Toxicity
- GLP (Y/N): N
- Year (study performed): 1974
- Species/Strain: Dog/Beagle
- [illegible]: Male/Female
- [illegible] of animals per dose: 2/dose
- Vehicle: gavage (undiluted in gelatin capsule)
- Route of administration: oral

Remarks:

- Age: ?
- Doses (mg/kg): 1083
  Doses per time period: one/14 days
- Volume administered or concentration:
- Post dose observation period: 14 days
  Exposure duration (for inhalation studies)

Results:

LD_0 > 1083 mg/kg

Remarks:

Conclusions:

Data Quality:

References:

Arthur, B.H., W.R. Gibson, W.J. Griffing and C.C. Kehr, The effect on laboratory animals from single dose exposures to o-chlorotoluene. Toxicology Division Lilly Research Laboratories, 1974.

Other:

- Identity: o-chlorotoluene (lot 90, study id. No. 22679 composition was 96.4% o-chlorotoluene, 3% p-chlorotoluene and < 0.5% m-chlorotoluene)

METHOD

- Method: Toxicology Division Lilly Research Laboratories
- Type (test type): Acute Oral Toxicity
- GLP (Y/N): N
- Year (study performed): 1974
- Species/Strain: Cat/mongrel
- Sex: Male/Female
- [illegible] of animals per dose: 2/dose
- Vehicle: gavage (undiluted in gelatin capsule)
- Route of administration: oral

Remarks:

- Age: ?
  Doses (mg/kg): 500
- Doses per time period:one/14 days
- Volume administered or concentration:
- Post dose observation period:14 days
- Exposure duration (for inhalation studies)

Results:

LD_0 > 500 mg/kg

Remarks:

Conclusions:

Data Quality:

References:

Arthur, B.H., W.R. Gibson, W.J. Griffing and C.C. Kehr, The effect on laboratory animals from single dose exposures to o-chlorotoluene. Toxicology Division Lilly Research Laboratories, 1974.

Other:

- Identity: o-chlorotoluene (lot 90, study id. No. 22679 composition was 96.4% o-chlorotoluene, 3% p-chlorotoluene and < 0.5% m-chlorotoluene)

METHOD

- Method: Toxicology Division Lilly Research Laboratories
- Type (test type): Acute Oral Toxicity
- GLP (Y/N): N
- Year (study performed): 1974
- Species/Strain: Chicken/White Rock x
- Male/Female
- of animals per dose: 5 of each sex/dose
- Vehicle: gavage (undiluted)
- Route of administration: oral

Remarks:

- Age: young adult
- Doses (mg/kg): 2710 and 5410
- Doses per time period: one/14 days

- Volume administered or concentration:
- Post dose observation period:14 day
- Exposure duration (for inhalation studies)

Results:

Estimated LD,, ~ 5000 mg/kg

Remarks:

Conclusions:

Data Quality:

References:

Arthur, B.H., W.R. Gibson, W.J. Griffing and C.C. Kehr, The effect on laboratory animals from single dose exposures to o-chlorotoluene. Toxicology Division Lilly Research Laboratories, 1974.

Other:

- Identity: o-chlorotoluene (lot 90, study id. No. 22679 composition was 96.4% o-chlorotoluene, 3% p-chlorotoluene and < 0.5% m-chlorotoluene)

METHOD

- Method: Toxicology Division Lilly Research Laboratories
- Type (test type): Acute Oral Toxicity
- GLP (Y/N): N
- Year (study performed): 1974
- Species/Strain: Bobwhite quail/*Colinus* ***virginianus***
- ♦m⊠□ Male/Female
- ☠□✍ of animals per dose: 5 of each sex/dose
- Vehicle: gavage (undiluted in gelatin capsules)
- Route of administration: oral

Remarks:

- Age: young adult
- Doses (mg/kg): 2710 and 5410
- Doses per time period:one/14 days
- Volume administered or concentration:
- Post dose observation period:14 day
- Exposure duration (for inhalation studies)

Results:

LD_0 > 5410 mg/kg

Remarks:

Conclusions:

Data Quality:

References:

Arthur, B.H., W.R. Gibson, W.J. Griffing and C.C. Kehr, The effect on laboratory animals from single dose exposures to o-chlorotoluene. Toxicology Division Lilly Research Laboratories, 1974.

Other:

- Identity: o-chlorotoluene (lot 90, study id. No. 22679 composition was 96.4% o-chlorotoluene, 3% p-chlorotoluene and < 0.5% m-chlorotoluene)

METHOD

- Method: Toxicology Division Lilly Research Laboratories
- Type (test type): Acute Oral Toxicity
- GLP (Y/N): N
- Year (study performed): 1974
- Species/Strain: Mallard duck/*Anas platyrhynchos*
- ♦ Male/Female
- of animals per dose: 5 of each sex/dose

- Vehicle: gavage (undiluted)
- Route of administration: oral

Remarks:
- Age: young adult
- Doses (mg/kg): 2710 and 5410
- Doses per time period: one/14 days
- Volume administered or concentration:
- Post dose observation period: 14 day
- Exposure duration (for inhalation studies)

Results:

LD_0 > 5410 mg/kg

Remarks:

Conclusions:

Data Quality:

References:

Arthur, B.H., W.R. Gibson, W.J. Griffing and C.C. Kehr, The effect on laboratory animals from single dose exposures to o-chlorotoluene. Toxicology Division Lilly Research Laboratories, 1974.

Other:

- Identity: o-chlorotoluene (not specified)

METHOD
- Method: Not specified
- Type (test type): Acute Inhalation Toxicity
- GLP (Y/N): N
- Year (study performed) : 1972
- Species/Strain: Rat (albino)/not indicated
- Sex: Male
- No. of animals per dose: 10/dose

- Vehicle: vaporization tube(metered material in U-tube in oil bath at 80°C)
- Route of administration: inhalation

Remarks:

- Age: young adult
- Doses (ppm): 3471, 6402, 8406, and 8819
- Doses per time period:one/ 4 hours
- Volume administered or concentration:
- Post dose observation period:14 days
- Exposure duration (for inhalation studies) : 4 hours

Results:

LC_{50} (male) = 7119 ppm

Remarks:

Conclusions:

Data Quality:

References:

Acute vapor inhalation toxicity (LC_{50}) The effect of o-chlorotoluene in rats. Final Report, Hazleton Laboratories, Inc., Leesburg, Virginia, 1972.

Other:

- Identity: o-chlorotoluene (lot 90, study id. No. 22679 composition was 96.4% o-chlorotoluene, 3% p-chlorotoluene and < 0.5% m-chlorotoluene)

METHOD

- Method: Toxicology Division Lilly Research Laboratories
- Type (test type) : Acute Inhalation Toxicity
- GLP (Y/N): N
- Year (study performed): 1974
- Species/Strain: Rabbit/New Zealand albino

- Sex: Male/Female
- No. of animals per dose: 3 of each sex/dose
- Vehicle: painted on abraded skin under an occlusive bandage
- Route of administration: dermal

Remarks:
- Age: young adult
- Doses (mg/kg): 2165
- Doses per time period: one/ 24 hours
- Volume administered or concentration:
- Post dose observation period: 13 days
- Exposure duration (for inhalation studies)

Results:

LD, (male/female) > 2165 mg/kg
No observed mortality at either test concentation.

Remarks:

Exposed rabbits exhibited reduced activity and appetite for 2-4 days post-exposure. There were no abnormalities observed in examined viscera.

Conclusions:

Data Quality:

References:

Arthur, B.H., W.R. Gibson, W.J. Griffing and C.C. Kehr, The effect on laboratory animals from single dose exposures to o-chlorotoluene. Toxicology Division Lilly Research Laboratories, 1974.

Other:

TEST SUBSTANCE
- Identity: ortho-chlorotoluene (Lot no. XHH 12, concentration not specified)

METHOD
- Method: Toxicology Division Lilly Research Laboratories

- Type (test type): Acute Oral Toxicity Screen
- GLP (Y/N): N
- Year (study performed): 1976
- Species/Strain: Rabbit/New Zealand Albino
- Sex: Male/Female
- No. of animals per dose: l/low dose, 2/high dose
- Vehicle: none, applied undiluted
- Route of administration: dermal

Remarks:

- Age: not specified
- Doses (mg/kg): 5010 and 7940
- Doses per time period: one initial 24 hr. dose
- Volume administered or concentration:
- Post dose observation period: 14 days
- Exposure duration: 24 hours

Results:

LD_{50} (estimated dermal) > 7940 mg/kg

Remarks:

Conclusions:

Data Quality:

References:

Acute toxicity screen with ortho-chlorotoluene. Younger Laboratories, Inc., 1976.

5. GENETIC TOXICITY DATA

5.1 GENETIC TOXICITY IN VIVO (CHROMOSOME ABERRATIONS)

TEST SUBSTANCE

- Identity: orthochlorotoluene (indicated purity of 96.5%)

METHOD

- Method : Rat Bone Marrow Cytogenetic Assay (protocol 452)
- Type (test type): Mutagenicity
- GLP (Y/N): Y
- Year (study performed) : 1982
- Species : Rat
- Strain : Sprague-Dawley [CRL:COBS CD(SD)BR]
- [illegible] male/female
- Route of administration: oral gavage
- Doses/concentration levels (mg/kg): 30, 100 and 300
- Exposure methods:
- Statistical methods: Student t-test (Bancroft, 1957)

Remarks :

-- Age at study initiation: adult (age not specified)
No of animals per dose: 32

- Vehicle : corn oil
- Frequency of treatment : acute = 1 dose at test
subchronic = 5 doses, 1/day

- Sampling times and number of samples:
acute exposure: 8 animals sampled at 6 hrs., 24 hrs. and 48 hrs.
chronic exposure: 8 animals sampled 6 hrs. after last exposure.

- Control groups and treatment:
Negative control = corn oil (1.0 ml/male animal, 0.8 ml/female animal)

Positive control = triethylenemelamine (TEM) At 0.75 and 1.0 mg/kg administered by intraperitoneal injection

Clinical observations performed: clinical pathology of bone marrow cells

Organs examined at necropsy: microscopic examination of bone marrow cells for chromosomal aberrations

Criteria for evaluating results (cell types examined, number of cells counted, etc.) : cell chromosomes were evaluated for gross Lesions or changes in chromosome number which could survive more than one mitotic cycle within the cell. Aberrations were

identified which resulted from breaks which did not repair or repairs which formed atypical (abnormal) combinations.

Criteria for selection of M.T.D.

Results:

Remarks:

Mortality at each dose level by sex

- Mutant/aberrat ion/mPCE/polyploidy frequency, as approp.

Dose Type & Time post-exposu re	Treatment	No. of Cells Scored	No. of Cell Aberrations	Aberrations/Cell Structural	Numerical
24 hr. Acute	TCM Control				
	0.75 mg/kg	137	79	>2.847	0.051
	1.00 mg/kg	374	180	>2.564	0.056
Acute -- 6, 24, 48 hr	Corn Oil Control	1565	15	0.010	0.007
	o-chlorotoluene				
	30 mg/kg	1048	6	0.006	0.004
	100 mg/kg	777	4	0.005	0.003
	300 mg/kg	906	7	0.009	0.006
Subchron ic 6 hours	Corn Oil Control	361	2	0.006	0.011
	o-chlorotoluene				
	30 mg/kg	351	1	0.003	0.009
	100 mg/kg	313	0	0.000	0.000
	300 mg/kg	258	3	0.016	0.004
Combined, acute & subchronic 6, 24, 48 hr	Corn Oil Control	1926	17	0.009	0.008
	o-chlorotoluene				
	30 mg/kg	1399	7	0.005	0.004
	100 mg/kg	921	4	0.004	0.003
	300 mg/kg	1164	10	0.010	0.005

This study concluded that o-chlorotoluene did not induce significant numbers o f chromosome aberrations under the employed acute and subchronic exposure regimes under in vivo test conditions.

- Description, severity, time of onset and duration of clinical signs at each dose level and sex
- Body weight changes by dose and sex
- Food/water consumption changes by dose and sex

Conclusions:

Data Quality:

References:

Mutagenicity evaluation of orthochlorotoluene (OCT) in the rat bone marrow cytogenetic assay. Final Report, Litton Bionetic, Inc., Kensington, Maryland, 1982.

TEST SUBSTANCE

- Identity: o-chlorotoluene

METHOD

- Method:
- Type (test type):
- GLP (Y/N):
- Year (study performed): 19
- Species:
- Strain:
- [illegible]
- Route of administration:
- Doses/concentration levels:
- Exposure methods:
- Statistical methods:

Remarks:

- Age at study initiation:
- No. of animals per dose:
- Vehicle:
- Frequency of treatment:
- Sampling times and number of samples:
- Control groups and treatment:

- Clinical observations performed (clinical pathology, functional observations, etc.)
- Organs examined at necropsy (macroscopic and microscopic)
- Criteria for evaluating results (cell types examined, number of cells counted, etc.)
- Criteria for selection of M.T.D.

Results:
Remarks:

- Mortality at each dose level by sex
- Mutant/aberration/mPCE/polyploidy frequency, as approp.
- Description, severity, time of onset and duration of clinical signs at each dose level and sex
- Body weight changes by dose and sex
- Food/water consumption changes by dose and sex

Conclusions:

Data Quality:

References:

5.2 GENETIC TOXICITY IN VITRO (GENE MUTATIONS)

5.2.1
TEST SUBSTANCE

- Identity: p-chlorotoluene

METHOD

- Method: Ames Salmonella/Microsome Assay
- Type (test type): In Vitro Microbiological Mutagenicity
- System of testing(bacterial, non-bacterial) : bacterial
- GLP (Y/N) : unknown
- Year (study performed) : 1992

- Species/Strain or cell type or cell line, bacterial:
  Bacteria: *Salmonella typhimurium* -
  Strains: TA1535, TA1537, TA1538, TA97, TA98 and TA100

- Metabolic activation: Yes, with Aroclor 1254 (10% and 30%)
  Species and cell type: Hamster, liver S-9 homogenate and
  Rat, liver S-9 homogenate
  - Quantity
  - Induced or not induced
- Concentrations tested:
  Salmonella typhimurium Assays:
  In standard assays (µg/plate):
  In Desiccator assays (ml/desiccator):

- Statistical methods:
  Salmonella typhimurium Assays:

Remarks:

- Test Design:

  -No. of replicates:
  -Frequency of dosing:
  -Positive and negative control groups & treatment:
  -Number of metaphases analyzed:
  --Solvent
  --Description of follow up repeat study
  -Criteria for evaluating results (cell evaluated per dose group)
  -Criteria for selection of M.T.D.

Results:

- Cytotoxic concentration:

  - With metabolic activation
  - Without metabolic activation

- Genotoxic effects (positive, negative, unconfirmed, dose-response, equivocal):

  - With metabolic activation: Negative
  - Without metabolic activation: Negative

- Statistical results, as appropriate:

Remarks :

- Frequency of reversions/mutations/aberrations/polyploidy as appr0p.
  M_totic

Conclusions:

Data Quality:

References:

Zeiger, E., B. Anderson, S. Haworth, T. Lawlor and K. Mortelmans. Salmonella mutagenicity tests. V. Results from the testing of 311 chemicals Environ. Mol. Mutagen. 19(Suppl. 21)::2-141, 1992.

5.2.2

TEST SUBSTANCE

- Identity: p-chlorotoluene

METHOD

- Method : Ames Salmonella/Microsome Assay
- Type (test type) : In Vitro Microbiological Mutagenicity
- System of testing(bacterial, non-bacterial) : bacterial
- GLP (Y/N): unknown
- Year (study performed) : 1978
- Species/Strain or cell type or cell line, bacterial:
  Bacteria: ***Salmonella typhimurium***
  Strains: TA1535, TA1537, TA1538, TA98 and TA100
  Yeast: ***Saccharomyces cerevisiae***
  Strain: D3
- Metabolic activation: Yes, with Aroclor 1254

- Species and cell type: Rat, liver homogenate
- Quant ity

Induced or not induced

- Concentrations tested:

Salmonella typhimurium Assays :

In standard assays (µg/plate) : 10, 50, 100, 500, 1000 and 5000

In Desiccator assays (ml/desiccator): 0.05, 0.10, 0.50 and 1.00

Saccharomyces cerevisiae Assays:

concentration (w/v or v/v): 0.0005, 0.001, 0.005 and 0.01

- **Statistical** methods:

Salmonella typhimurium Assays:

Saccharomyces cerevisiae Assays:

Calculate the number of recombinants/10^5 survivors

A positive response is indicated by a dose-related increase of qreater than 300% in number of mitotic recombinants per ml and in relative number of mitotic recombinants per 10' survivors.

Remarks:

- Test Design:

-No. of replicates:
-Frequency of dosing:
--Positive and negative control groups & treatment:
-Number of metaphases analyzed:
-Solvent
-Description of follow up repeat study
-Criteria for evaluating results (cell evaluated per dose group)
-Criteria for selection of M.T.D.

Results:

- Cytotoxic concentration:

- With metabolic activation

- Without metabolic activation

- Genotoxic effects (positive, negative, unconfirmed, dose-response, equivocal):

  With metabolic activation
  - Without metabolic activation

- Statistical results, as appropriate:

Remarks:

- Frequency of reversions/mutations/aberrations/polyploidy as approp.
- Precipitation concentration if applicable
- Mitotic

Conclusions:

Data Quality:

References:

Simmon, V. F. and K. Kauhanen. In vitro microbiological mutagenicity Assays of p-chlorotoluene. Prepared for EPA National Environmental Research Center - Water Supply Research Laboratory, by SRI International, Menlo Park, CA, 1978.

6. REPEATED DOSE TOXICITY

6.1

TEST SUBSTANCE

- Identity: p-chlorotoluene

METHOD

- Method: Toxicology Division Lilly Research Laboratories
- Type(test type): 14-day Subacute Toxicity
- GLP (Y/N): *

- ⁂ (study performed) : 1990
- Species/Strain: Rat/Sprague-Dawley
- Sex: Female and Male
- Exposure period: 1 dose/day
- No. of animals of each sex per dose: 10/dose
- Vehicle: corn oil (dose dependent)
- Route of administration: oral ( )

Remarks:
- Age: adult (grams)
- Doses (mg/kg): 200, 600 and 1800
  Doses per time period: one/day
  Volume administered or concentration:
- Post dose observation period: day

Results:

8 of 10 male and female rats died in 1800 mg/kg/day exposure group
LD_{50} = ? mg/kg

Remarks :
The observed toxic effects included:

The classified p-chlorotoluene as ?????? toxic.

Conclusions:
These test results agree with prior test results which indicated that p-chlorotoluene exhibits low to moderate toxicity to this species.

Data Quality:

References:
Terrill, J. B. et al., J. Am. Coll. Toxicol., 9(5):487-96, 1990.

6.2

TEST SUBSTANCE

- Identity: p-chlorotoluene

METHOD

- Method: Toxicology Division Lilly Research Laboratories
- Type (test type) : 90-day Subacute Toxicity
- GLP (Y/N) : N
- Year (study performed) : 1990
- Species/Strain: Rat/Sprague-Dawley
- [illegible] Female and Male
- Exposure period: 1 dose/day
- [illegible] of animals of each sex per dose: 10/dose
- Vehicle : corn oil (dose dependent)
- Route of administration: oral ( )

Remarks:

Age: adult (grams)
Doses(mg/kg) : 50, 200 and 800
Doses per time period:90 days
Volume administered or concentration:
- Post dose observation period: ? day

Results:

4 of 10 male and 2 of 10 female rats died in 800 mg/kg/day exposure group
LD_{50} = ? mg/kg

Remarks :

Animals in the 800 mg/kg/day exposure group exhibited observed toxic effects which included:

The classified p-chlorotoluene as ???????? toxic.

Conclusions:
These test results agree with prior test results which indicated that p-chlorotoluene exhibits low to moderate toxicity to this species.

Data Quality:
unknown

References:
Terrill, J. B. et al., J. Am. Coll. Toxicol., 9(5):487-96, 1990.

6.3
TEST SUBSTANCE

- Identity: monochlorotoluene isomers (Lot No. S-75-1300: 51% ortho-chlorotoluene, 48% para-chlorotoluene)

METHOD

- Method:
- Type (test type): 90-day Subacute
- GLP (Y/N): unknown
- Year (study performed): 1976
- Species: Rat
- Strain: Charles River (albino)
- Sex: male & female
- Exposure period: 1 dose/day
- Dose/concentration levels: 0, 100, 300 and 1000 mg/kg/day
- Route of administration: oral (gavage, with hypodermic needle with intubation needle)
- Frequency of treatment: 1/day
- Control group and treatment: received 0.2 ml corn oil/100 grams of body weight daily
- Post-exposure observation period: none
- Statistical methods: One-Way Analysis of Variance for body weight, hematologic, clinical blood chemistry and organ weight data.

Tukey's or Scheffe's Multiple Comparison Test.
Kruskal-Wallis Statistic Test and Kruskal-Wallis Multiple Comparison Test for organ:body weight & organ:brain weight ratios.

Remarks:

Test Subjects
Age at study initiation: 38 days
No . of animals per sex per dose: 15/sex/dose

Study Design
Vehicle: corn oil
Clinical observations performed and frequency (clinical pathology, functional observations, etc.)
Organs examined at necropsy (macroscopic and microscopic)

Results:

- NCAEL (NOEL) : 100 mg/kg/day (based on weight gain)
- . LOAEL (LOEL) : 300 mg/kg/day (based on weight gain)
- Toxic response/effects by dose level:
  There was no observed dose related mortality in this Study. Animals in the 1000 mg/kg/day exposure group exhibited resistence to dosing along with increased salivation after 3 days of testing and continuing through the end of the test. The same animals also exhibited excessive urination during week 7 of exposure, continuing through the end of the 90-day exposure. The high exposure group also exhibited an increase in albumin concentration in urine samples at 40 days of testing, but the albumin level was similar to the other test groups and controls at day 30. Hematological and blood chemistry studies noted no abnormalities in any of the test groups.
- Statistical results, as appropriate:

Remarks :

Body weight :
Body weights were slightly reduced for males and

females in the highest exposure group (1000 mg/kg/day) and for the females in the 300 mg/kg/day exposure group.

Food/water consumption:

Food consumption was similar in all test groups.

Conclusions:

There was no evidence of significant monochlorotoluene toxicity in any of the exposure groups in this 90-day subacute study.

Data Quality:

Reliable (study was subject to an external audit)

References:

Albanese, E., A. J. Marias. 90-day subacute oral toxicity study with monochlorotoluene isomers in albino rats. Report to Hooker Chemical and Plastics Corp. , by Industrial Bio-Test Laboratories, Inc., Northbrook, Illinois, 1977.

6.2

TEST SUBSTANCE

- Identity: monochlorotoluene isomers (Lot No. S-75-1300: 51% ortho-chlorotoluene, 48% para-chlorotoluene)

METHOD

- Method:
- Type (test type): 90-day Subacute
- GLP (Y/N): unknown
- [illegible] (study performed) : 1976
- [illegible] Canine (Dog)
- Strain : Beagle
- Sex: male & female
- Exposure period: 1 dose/day
- Dose/concentration levels: 0, 30, 100, and 300 mg/kg/day
- Route of administration: oral (in capsule)
- Frequency of treatment: 1/day

- Control group and treatment: received corn oil in gelatin capsules/daily
- Post exposure observation period: none
- Statistical methods: One-Way Analysis of Variance for body weight, hematologic, clinical blood chemistry and organ weight data.
  Tukey's or Scheffe's Multiple Comparison Test.
  Kruskal-Wallis Statistic Test and Kruskal-Wallis Multiple Comparison Test for organ:body weight & organ:brain weight ratios.

Remarks :

- Test Subjects
  Age at study initiation: 5-5.5 months
  NO. of animals per sex per dose: 4/sex/dose

Study Design
Vehicle: monochlorotoluene/corn oil suspension in a gelatin capsule
Clinical observations performed and frequency (clinical pathology, functional observations, etc.)
Organs examined at necropsy (macroscopic and microscopic)

Results:

. NOAEL (NOEL) : 100 mg/kg/day (based on weight gain)
- LOAEL (LOEL) : 300 mg/kg/day (based on weight gain) only in male dogs
- Toxic response/effects by dose level:
  There was no observed dose related abnormalities for food consumption, behavioral reactions, mortality, blood chemistry, urinalysis, organ weights, gross pathology or microscopic pathology. Body weights were slightly reduced for males dogs in the highest exposure group (300 mg/kg/day). The same male animals also had slightly lower erythrocyte counts, hemoglobin concentrations and hematocrit values than control males, although they were still considered to be within the normal range for these endpoints.

Remarks :

Body weight:
Body weights were **slightly reduced** for males dogs in the highest exposure group (300 mg/kg/day).
Food/water consumption:
Food consumption was similar in all test groups.

Conclusions:
There was no evidence of significant monochlorotoluene toxicity in any of the exposure groups in this 90-day subacute study.

Data Quality:
Reliable (study was subject to an external audit)

References:
Burtner, 3. R., 90-day subacute oral toxicity study with monochlorotoluene isomers (lot no. S-75-1300) in beagle dogs. Report BTL 75-134 to Hooker Chemical and Plastics Corp., by Industrial Bio-Test Laboratories, Inc., Northbrook, Illinois, 1976.

TEST SUBSTANCE
- Identity: o-chlorotoluene

METHOD
- Method:
- Type (test type):
- GLP (Y/N):
- Year (study performed) : 19
- Species
- Strain:
- Sex:
- Exposure period:
- Dose/concentration levels:
- Route of administration:
- Exposure period:
- Frequency of treatment:
- Control group and treatment:
- Post exposure observation period:
- Statistical methods:

Remarks:

- Test Subjects
  Age at study initiation:
  No. of animals per sex per dose

- Study Design
  Vehicle
  Satellite groups and reasons they were added
  Clinical observations performed and frequency
  (clinical pathology, functional observations, etc.)
  Organs examined at necropsy (macroscopic and microscopic)

Results:

. NOAEL (NOEL):
. LOAEL (LOEL):
- Actual dose received by dose level by sex, if known:
- Toxic response/effects by dose level:
- Statistical results, as appropriate:

Remarks:

Body weight
Food/water consumption
Description, severity, time of onset & duration of clinical signs

Conclusions:

Data Quality:

References:

Other:

7. TOXICITY TO REPRODUCTION

8. DEVELOPMENTAL TOXICITY/TERATOTOGENICITY

TEST SUBSTANCE

- Identity: o-chlorotoluene

METHOD

- Method:
- Type (test type) :
- GLP (Y/N):
- Year (study performed): 19
- Species
- Strain:
- Sex:
- Exposure period:
- Dose/concentration levels:
- Route of administration:
- Exposure period:
- Frequency of treatment:
- Control group and treatment:
- Post exposure observation period:
- Statistical methods:

Remarks:

- Test Subjects
  Age at study initiation:
  No. of animals per sex per dose

- Study Design
  Vehicle
  Satellite groups and reasons they were added
  Clinical observations performed and frequency
  (clinical pathology, functional observations, etc.)

Organs examined at necropsy (macroscopic and microscopic)

Results:

. NOAEL (NOEL):

. LOAEL (LOEL):

- Actual dose received by dose level by sex, if known:
- Toxic response/effects by dose level:
- Statistical results, as appropriate:

Remarks:

Body weight
Food/water consumption
Description, severity, time of onset & duration of clinical signs

Conclusions:

Data Quality:

References:

REFERENCES

Banerjee, P.; Piwoni, M.D.; Ebeid, K.; Sorption of oranic contaminants to a low carbon subsurface core.; Chemosphere; 14:1057-67; 1985.

Daubert, T.E. & Danner, R.P.; Data compilation tables of properties of pure compounds,; American Institute of Chemical Engineers. Pp. 450; 1985.

Hansch, C. & Leo, A.J.; Medchem project.; Claremont, CA: Pomona College. Issue # 26.; 1985.

Merck Index.; The Merck Index. An encyclopedia of chemicals and drugs 10th ed.; Windholz, M Ed. Rahway, N.J.: Merck and Co., Inc.; 1983.

Sadtler; Sadtler standard spectra.; Philadelhia, PA: Sadtler Research Lab.; NA--

SRC.; Syracuse Research Corporation calculated values; 1988.

Valvani, S.C.; Yalkowsky, S.H.; Roseman, T.J.; Solubility and partitioning. IV. Aqueous solubility and Octanol-Water partition coefficients of liquid nonelectrolytes.; J. Pharm. Sci.; 70:502-7.; 1981.